

Hot rolled sheets, plates and coils (Bj P)



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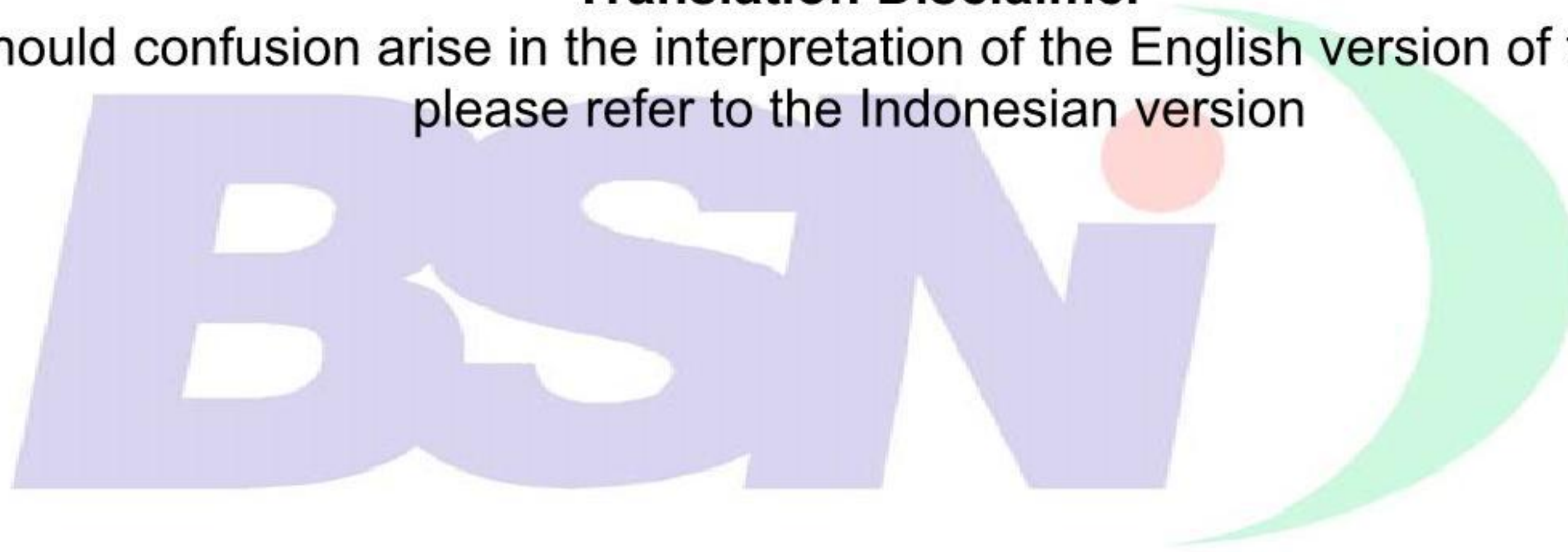




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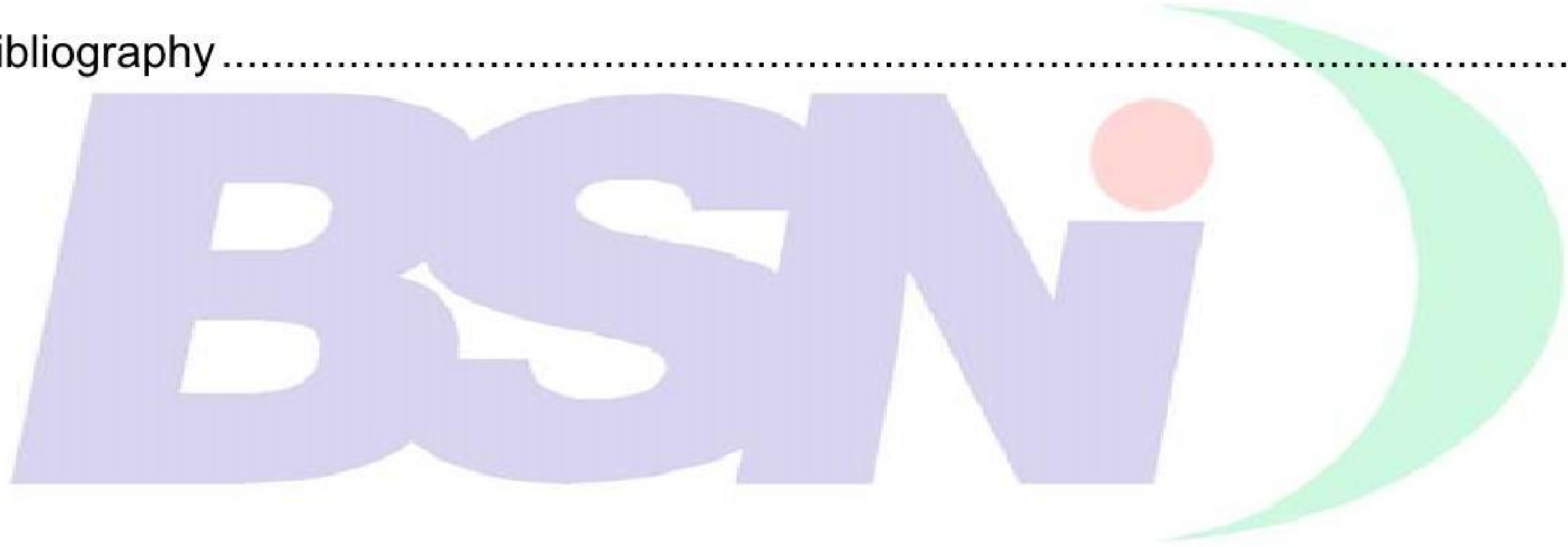
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Introduction

The Standar Nasional Indonesia (SNI) *Baja lembaran, pelat dan gulungan canai panas (Bj P)* [Hot Rolled steel sheets, plates and coils] is a revised edition of SNI 07-0601-1987, and developed based on the following considerations:

1. This standard was issued more than 5 years ago, and it shall be reviewed taking into consideration the consumers needs, manufacturers capabilities and technology development,
2. There is an urgent need to protect the consumers from inferior imported goods by mandatory implementation of SNI standards

This standard was deliberated in a consensus meeting held in Jakarta on September 16th, 2003; attended by representatives from industry, consumers, research institutions and other related institutions..

This standard was drafted by Technical Committee 5S, Iron, steel and steel products



Hot rolled steel sheets, plates and coils (Bj P)

1 Scope

This standard covers scope, normative references, terms and definitions, symbols and classifications, quality specifications, sampling methods, test methods, acceptance requirements and marking of hot rolled steel sheets, plates and coils

2 Normative references

SNI 07-0408-1989, *Cara uji tarik untuk logam*,

SNI 07-0410-1989, *Cara uji lengkung tekan logam*

SNI 07-0308-1989, *Cara uji komposisi kimia baja karbon*

SNI 07-0371-1998, *Batang uji tarik untuk bahan logam*,

SNI 07-0372-1998, *Batang uji lengkung untuk bahan logam*

JIS G 1253-2002, *Iron and steel-method for spark discharge atomic emission spectrometric analysis*

3 Terms and definitions

3.1

hot rolled steel sheet (Bj P)

flat steel, produced by hot rolling process of steel slabs at a temperature above the recrystallization temperature

3.2

Bj P coiled steel

Bj P in the form of coils

3.3

Bj P sheets

Bj P sheets of thickness less than 6 mm ($t < 6$ mm)

3.4

Bj P plates

Bj P sheets of thickness more than or equal to 6 mm ($t \geq 6$ mm)

3.5

dimensions of Bj P

thickness, width and length in millimeters (mm)

3.6

unit weight of Bj P

tonnes (1000 kgs)

3.7

nominal thickness, width and length of Bj P

thickness, width and length are specified in this standard

3.8

thickness, width and length tolerances

tolerance limits of nominal thickness, width and length

3.9

mechanical properties of Bj P

tensile strength and yield strength are stated in kg/mm^2 or N/mm^2 units ($1 \text{ kg/mm}^2 = 9,81 \text{ N/mm}^2$) and elongations are stated in percent

4 Symbols and classifications

4.1 Bj P Symbol

Symbol to be used for Bj P products are designated as follows



Example : Bj PC = commercial quality hot rolled steel

4.2 Bj P classification is based on its quality as presented in Table 1

Table 1 - Classification of Bj P

Symbol	Application
Bj PC	Commercial quality
Bj PD	Drawing quality
Bj PE	Deep drawing quality
Bj PS	Non aging deep drawing quality

5 Quality specifications

5.1 Dimensions

Nominal thickness, width and length and tolerances of Bj P are presented in Table2, Table 3, Table 4, Table 5 and Table 6

Table 2 Nominal thickness

Units in mm									
1,8	2,0	2,25	2,5	2,8	3,0	3,2	3,6	4,0	4,5
5,0	5,6	6,0	6,5	7,0	8,0	9,0	10,0	11,0	12,0
12,7	13,0	14,0	15,0	16,0	17,0	18,0	19,0	20,0	22,0
24,0	25,0								

Table 3 - Thickness and tolerances

Nominal thickness	Width			
	L < 1600	1600 ≤ L < 2000	2000 ≤ L < 2500	2500 ≤ L < 3500
1,80	± 0,16	-	-	-
2,00	± 0,19	± 0,25	-	-
2,25	± 0,20	± 0,29	-	-
2,50	± 0,22	± 0,29	± 0,29	-
2,80	± 0,22	± 0,29	± 0,29	-
3,00	± 0,22	± 0,29	± 0,29	-
3,20	± 0,24	± 0,34	± 0,34	-
3,60	± 0,24	± 0,34	± 0,34	-
4,00	± 0,45	± 0,55	± 0,55	-
4,50	± 0,45	± 0,55	± 0,55	-
5,00	± 0,50	± 0,60	± 0,60	-
5,60	± 0,50	± 0,60	± 0,60	-
6,00	± 0,50	± 0,60	± 0,60	± 0,75
6,50	± 0,55	± 0,65	± 0,65	± 0,80
7,00	± 0,55	± 0,65	± 0,65	± 0,80
8,00	± 0,55	± 0,65	± 0,65	± 0,80
9,00	± 0,55	± 0,65	± 0,65	± 0,80
10,00	± 0,55	± 0,65	± 0,65	± 0,80
11,00	± 0,55	± 0,65	± 0,65	± 0,80
12,00	± 0,55	± 0,65	± 0,65	± 0,80
12,70	± 0,55	± 0,65	± 0,65	± 0,80
13,00	± 0,55	± 0,65	± 0,65	± 0,80
14,00	± 0,55	± 0,65	± 0,65	± 0,80
15,00	± 0,55	± 0,65	± 0,65	± 0,80
16,00	± 0,65	± 0,75	± 0,75	± 0,95
17,00	± 0,65	± 0,75	± 0,75	± 0,95
18,00	± 0,65	± 0,75	± 0,75	± 0,95
19,00	± 0,65	± 0,75	± 0,75	± 0,95
20,00	± 0,65	± 0,75	± 0,75	± 0,95
22,00	± 0,65	± 0,75	± 0,75	± 0,95
24,00	± 0,65	± 0,75	± 0,75	± 0,95
25,00	± 0,70	± 0,80	± 0,80	± 1,00

Table 4 - Size and width tolerances

Units in mm

Class	Rolled products	Side cut rolled products			
Thickness Width	$2,4 \leq t < 25$	$t < 3,15$	$3,15 \leq t < 6,0$	$6,0 \leq t < 20$	$20 \leq t < 25$
$600 \leq L < 630$	0, + 20	0, + 10	0, + 10	0, + 10	0, + 15
$630 \leq L < 1000$	0, + 25	0, + 10	0, + 10	0, + 10	0, + 15
$1000 \leq L < 1250$	0, + 30	0, + 10	0, + 10	0, + 15	0, + 15
$1250 \leq L < 1600$	0, + 35	0, + 10	0, + 10	0, + 15	0, + 15
$1600 \leq L < 2000$	0, + 40	0, + 10	0, + 10	0, + 1,2%	0, + 1,2%
$2000 \leq L < 3500$	0, + 40	0, + 10	0, + 10	0, + 1,2%	0, + 1,2%

Table 5 - Cut piece sizes and width tolerances

Units in mm

Thickness Width	$1,80 \leq t < 6,0$	$6,0 \leq t < 9,0$
$300 \leq L < 400$	$\pm 0,5$	$\pm 1,6$
$400 \leq L < 630$	$\pm 0,5$	$\pm 1,6$
$630 \leq L < 990$	$\pm 1,6$	$\pm 1,6$

Table 6 Size and length tolerances

Units in mm

Length Thickness	$1,80 \leq t < 25,00$
< 6300	+ 25 mm 0
≥ 6300	+0,5 % 0

5.2 Chemical composition

The chemical composition of Bj P shall comply to the classification presented in Table 7

Table 7 - Chemical composition of Bj P

Symbol	Maximum chemical composition (%)			
	C	Mn	P	S
Bj PS	0,25	0,60	0,04	0,03
Bj PC	0,15	0,60	0,04	0,03
Bj PD	0,10	0,50	0,04	0,03
Bj PE	0,10	0,50	0,02	0,02

5.3 Mechanical properties

Mechanical properties of Bj P shall comply with classification presented in Table 8

Table 8 - Mechanical properties

Designa- tion	Yield strength kg/mm ² (N/mm ²) (min)	Tensile strength kg/mm ² (N/mm ²) (min)	Elongation % (min)					Tensile test specimen (SNI 07- 0371-1998)	Bend angle	Inner radius with specimen thickness		Bend test specimen
			Thickness (mm)									
			1,8≤t<2,0	2,0≤t<2,5	2,5≤t<3,2	3.2≤t<4,0	≥4,0					
Bj PS	24,5 (245) (min)	41-52 (400-510) (min)	21	21	21	21	17	Test speci- men No 1 // rolling direction	-	-	-	Test speci- men No 1 // rolling direction
Bj PC	-	27,5 (270) (min)	29	29	29	31	31	Test speci- men No 5 // rolling direction	180°	Full Bend (0 x t)	Bend (½ x t)	Test speci- men No 3 // rolling direction
Bj PD	-	27,5 (270) (min)	32	33	35	37	39					
Bj PE	-	27,5 (270) (min)	33	35	37	39	41					
NOTE Material shall withstand being bent without cracking on the outside of the bent portion												

5.4 Appearance and shape

5.4.1 Appearance

The finished surface of Bj P shall be free from imperfections that are detrimental to further processing. Slight imperfections of Bj P plates can be repaired by grinding. The maximum grinding depth shall be 7% of thickness and with an imperfect surface area of 2% of one side surface of the plate and sheet, repair work by welding is not permitted.

5.4.2 Shape tolerance

The shape of Bj P is specified in Table 9, Table 10 and Table 11

a. Bj P surface flatness tolerances

Bj P surface flatness tolerances are specified in Table 9

Table 9 - Bj P surface flatness tolerance

Units in mm		
Width Thickness	Up to 2000 (b) maximum	2000 < L < 3500 (b) maximum
$1,8 \leq t < 3,2$	18	-
$3,2 \leq t < 4,0$	16	-
$4,0 \leq t < 6,0$	14	24
$6,0 \leq t < 10,0$	13	21
$10,0 \leq t < 14,0$	12	12

5.5 Appearance and shape

5.5.1 Appearance

The finished surface of Bj P shall be free from imperfections that are detrimental to further processing. Slight imperfections of Bj P plates can be repaired by grinding. The maximum grinding depth shall be 7% of thickness and with an imperfect surface area of 2% of one side surface of the plate and sheet, repair work by welding is not permitted.

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a. Bj P surface flatness tolerances

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Units in mm		
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$3,2 \leq t < 4,0$	16	-
$4,0 \leq t < 6,0$	14	24
$6,0 \leq t < 10,0$	13	21
$10,0 \leq t < 14,0$	12	12

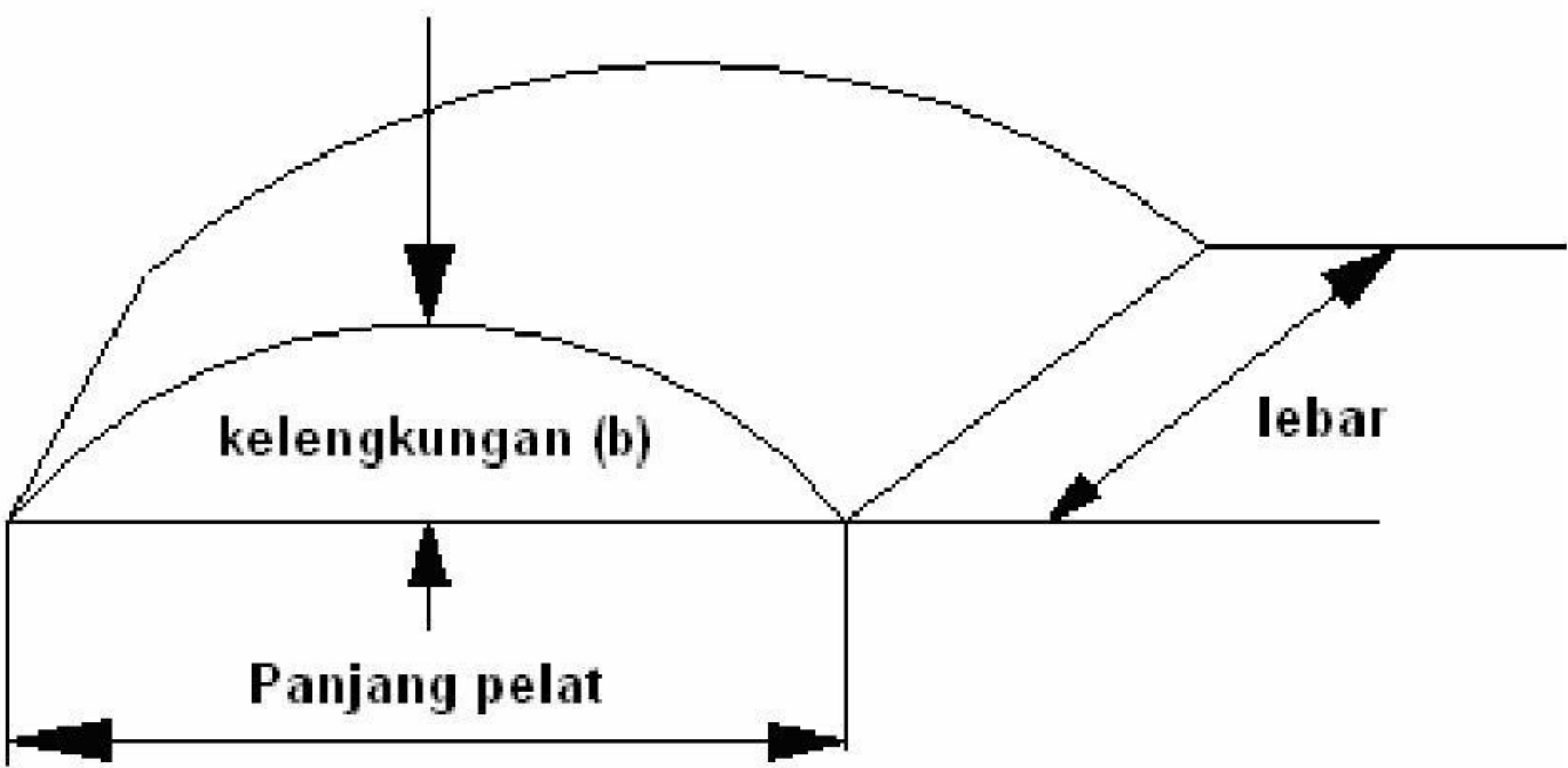


Figure 1 - Surface flatness

b. Side camber tolerance in longitudinal direction for steel coils
Side camber tolerance in longitudinal direction for steel coils are shown in Figure 2 and specified in Table 10

Table 10 - Side camber tolerance Bj P in longitudinal direction for coils

Units in mm	
Width	Maximum value
< 250	8 in any 2000 length
≥ 250	5 in any 2000 length

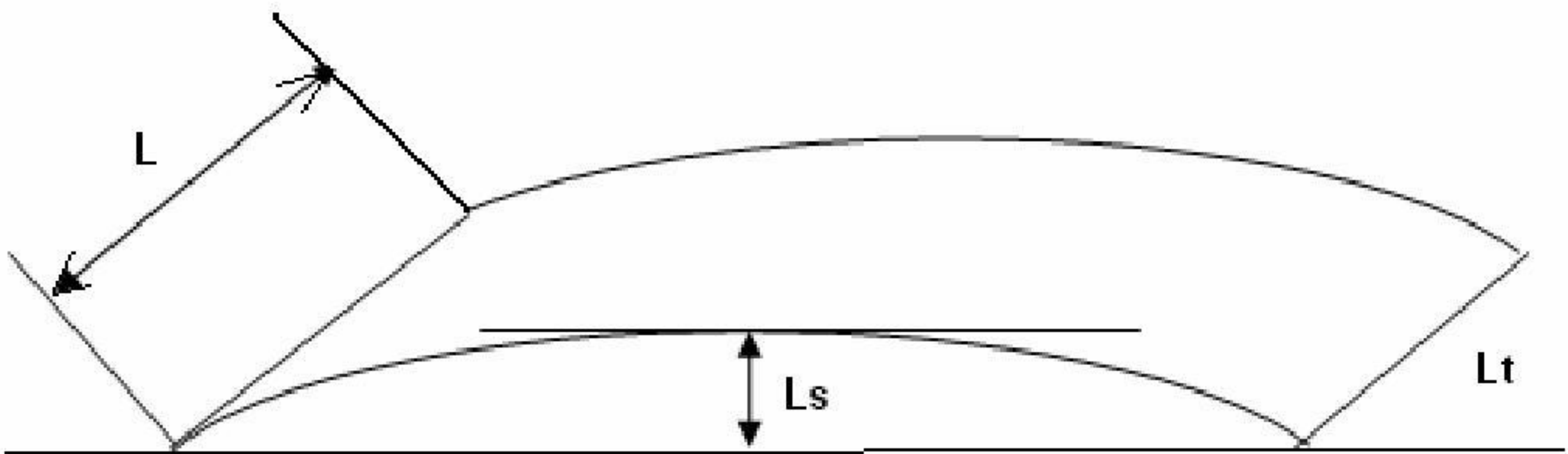


Figure notes:

- L is Width of steel coil, mm
- Ls is Edge camber, mm
- Lt is Straight edge line

Figure 2 - Camber of steel coil in any 10.000 mm length

c. Side camber tolerance in longitudinal direction for steel plates
Side camber tolerance in longitudinal direction for Bj P steel plates are shown in Figure 3 and specified in Table 11

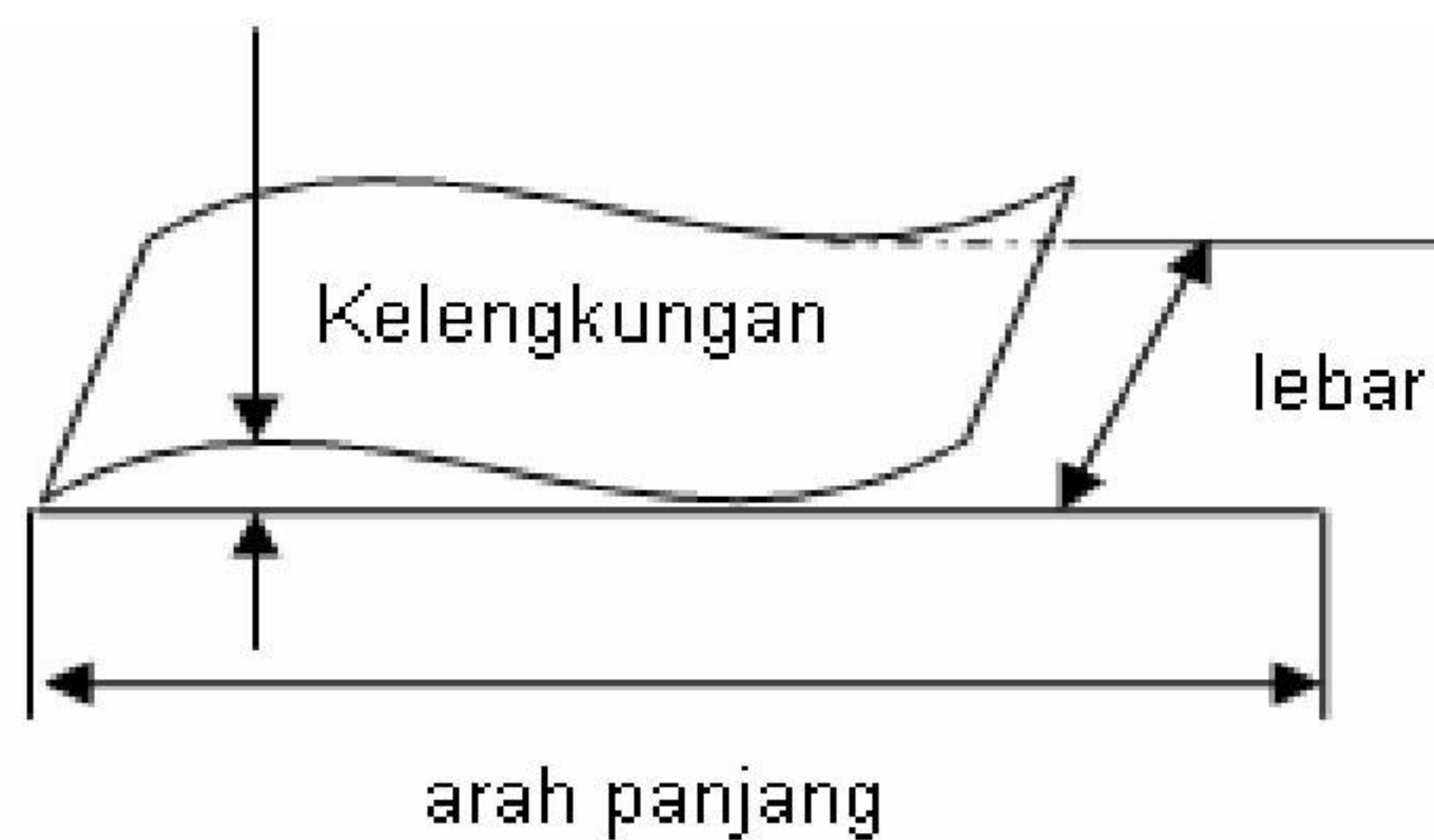


Figure 3 - Steel plate flatness

Table 11 - Camber tolerances for steel plates in longitudinal direction

		Units in mm		
Length \ Width		$250 \leq L < 630$	$630 \leq L < 1000$	$L \geq 1000$
$P < 2500$		5	4	3
$2500 \leq P < 4000$		8	6	5
$4000 \leq P < 6300$		12	10	8
$6300 \leq P < 10000$		20	16	12
$P \geq 10000$		20 in any 10000 length	16 in any 10000 length	12 in any 10000 length

d. Tolerance in deviation from flatness (g)

Maximum tolerances in deviation from flatness for Bj P coils are shown in Figure 4 and specified in Table 12

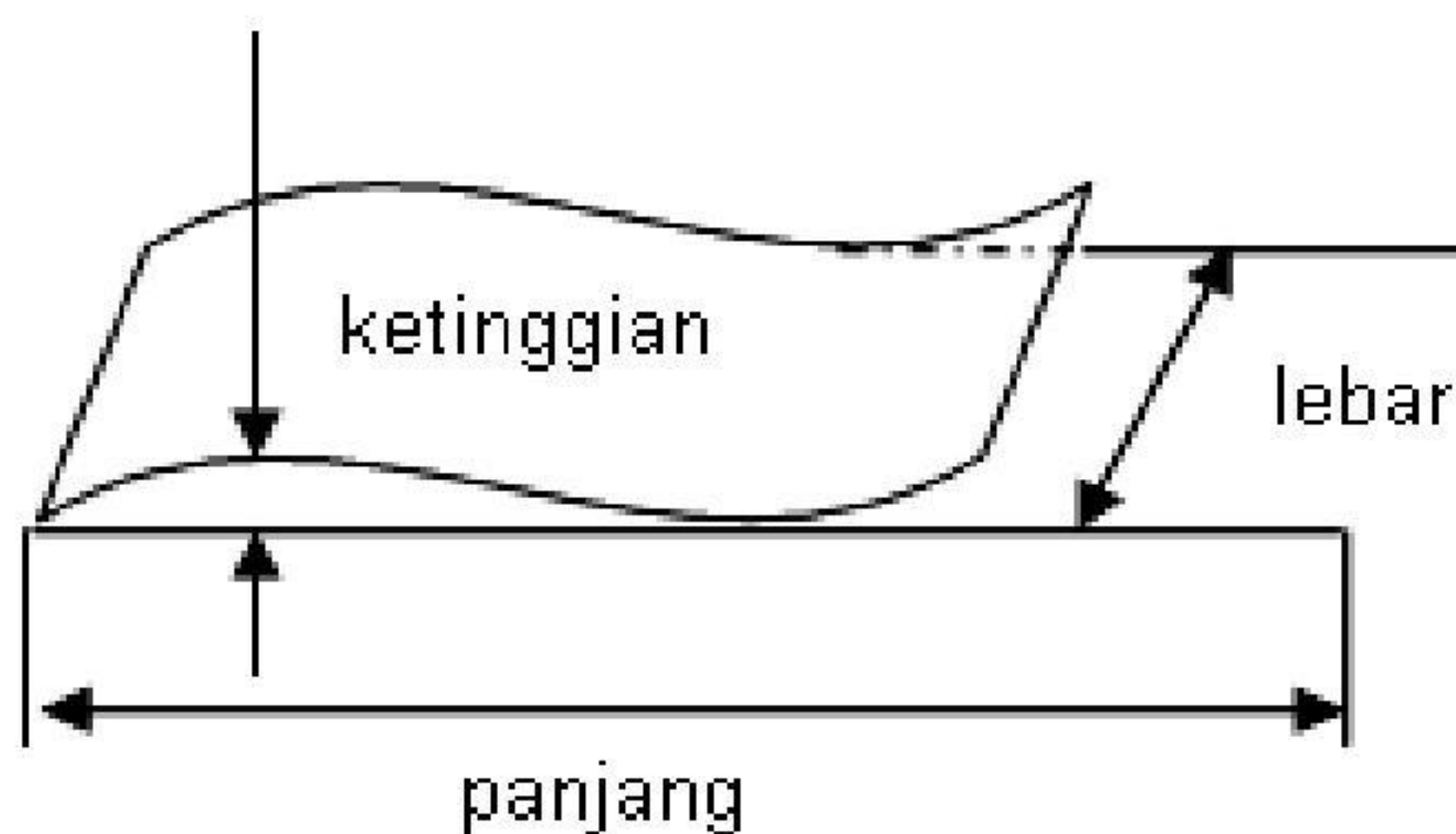


Figure 4 - Deviation from flatness

Table 12 - Deviation from flatness for Bj P coils

Units in mm	
Width	Deviation from flatness (g maximum)
$L < 1000$	16
$1000 \leq L < 1600$	18
$L > 1600$	20

5.5.3 Out-of-square tolerances for steel sheets

The maximum out-of-square tolerances (A) for steel sheets shall be 1%. Its values are shown in Figure 5

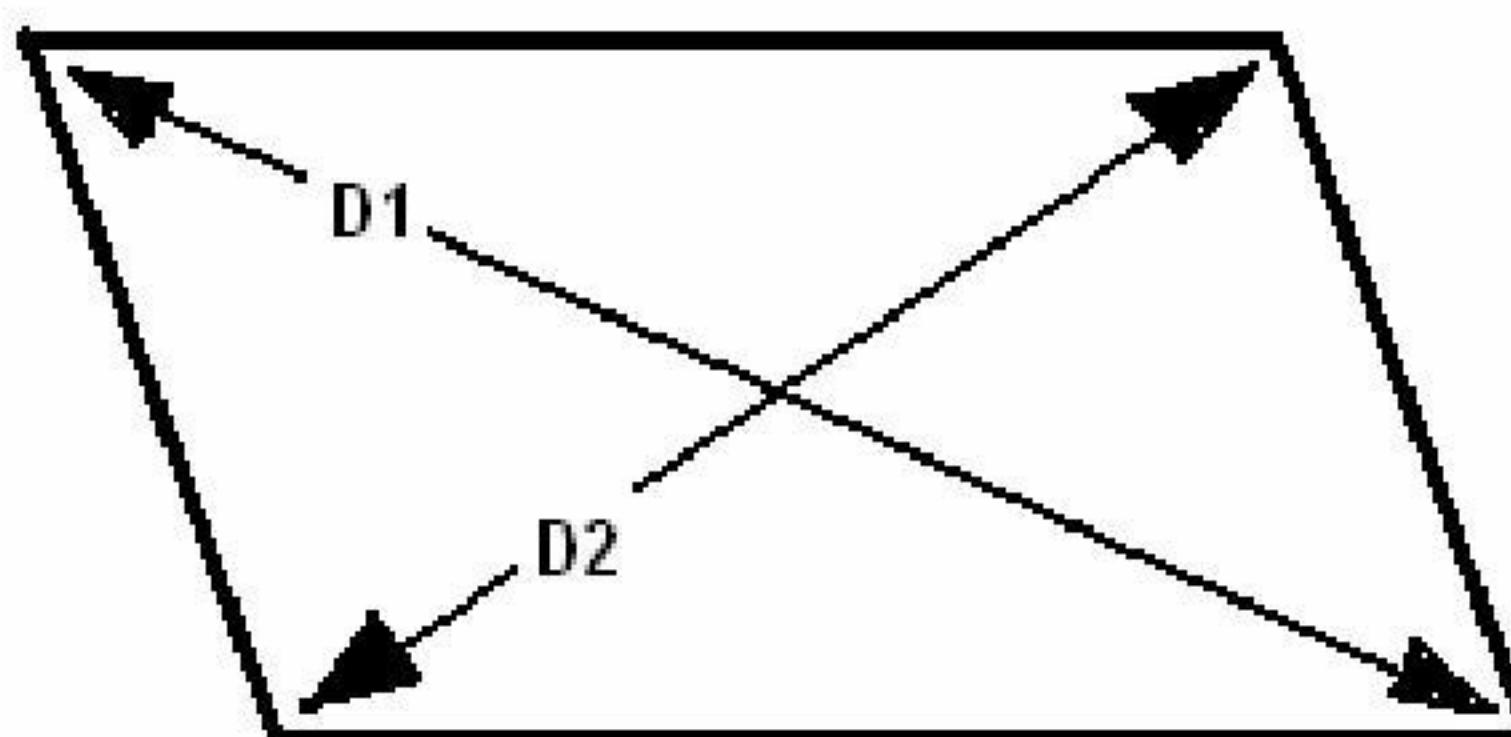


Figure 5 - Squareness of sheets

Note $(A) = \frac{D_1 - D_2}{D_2}$ shall be $\leq 1\%$.

6 Sampling methods

6.1 Sampling shall be performed by authorized personel.

6.2 Sampling shall be performed at random

6.3 Number of samples

- One sample shall be taken from each lot of one heat and same size.
- One sample shall be taken from every 50 tonnes of a lot of one heat consisting of more than one single size and steel grade.
- Samples for mechanical tests of Bj P coils, shall be taken at minimum 1,5 m from the edge of the coil with a maximum length of 1 m.
- Samples for mechanical tests of steel sheets and plates shall be taken from each edge of the sheet with a maximum length of 0,5 m.

7 Test methods

7.1 Chemical composition tes

Chemical composition shall be determined in accordance with SNI 07-0308-1989, *Cara uji komposisi kimia baja karbon* or by spectrometer method in accordance with JIS G 1253-1997, *Iron and steel – method for spark discharge atomcs emission spectrometric analysis*.

7.2 Mechanical test

7.2.1 Tensile test

The tensile test shall be carried out in accordance with SNI 07-0408-1989, *Cara uji tarik logam*. Test specimen shall be in accordance with requirements in SNI 07-0371-1998, *Batang uji tarik untuk bahan logam*.

7.2.2 Bend test

The bend test shall be carried out in accordance with SNI 07-0410-1989, *Cara uji lengkung tekan logam*. Test specimen shall be in accordance with requirements in SNI 07-0372-1998, *Batang uji lengkung untuk bahan logam*.

7.3 Appearance and shape

Appearance of Bj P is tested visually without any use of auxilliary equipment, while shape dimensions are determined using suitable measuring apparatus and in accordance with values specified in Table 9, Table 10, Table 11 and table 12.

8 Acceptance requirements

Acceptance requirements of Bj P are as follows:

- Testing and test certificates are conducted and issued by a competent institution
- A lot is accepted whenever the test specimens taken from the respective lot conform to the quality requirements
- If any test result fails to meet the specified requirements, retests shall be permitted on twice (2 x) the number of the rejected specimens taken from the same lot.
- When the retests conform to the requirements, the lot is reported to conform to the requirements
- A lot is rejected whenever after subjected to retesting any test result does not meet the requirements

9 Marking

The following label marks shall be attached to each Bj P coil and sheet package:

- The name and logo of manufacturer
- Designation of product class
- Specifications
- Dimensions (thickness x width x length)
- Identification number (Coil number and heat number)
- Number of sheets in each Bj P package
- Mass of each steel sheet and plate package or steel coil

Bibliography

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JIS G 0303-2000, *General rules for inspection of steel*

JIS G 3101-1995, *Rolled sheets for general structure*

JIS G 3131-1996, *Hot rolled mild steel plates, sheets and strip*

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